USDA Agricultural Research Service

Enhanced Integrated Nitrogen Management on Dairy Farms

Sustainability of dairy farming is threatened by excessive nutrient buildup in the soil and nutrient losses to water and air.

This project is an integrated approach to improving nitrogen (N) cycling and retention on dairy farms. ***Our hypothesis:***

N will be used most efficiently on dairy farms only if improved practices are developed for all aspects of the N cycle, including the front end (cropping and feeding) of the dairy system and the back end (manure handling and storage).

Our research will

- evaluate the role of landscape vs. management on N cycling
- test cropping systems for N retention
- develop improved rations for protein utilization by cattle, and
- improve N use from manure.

Our education and technology transfer will

- develop University-level curricula
- train farmers and farm advisors
- inform policymakers and regulatory agency personnel

Outcome:

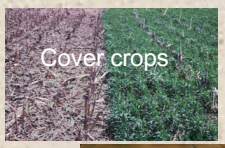
Healthy farms, healt[illegible]nunities

Tannins to improve N use

Balanced rations for N efficiency

Improved manure storage

A few of the topics...



Corralling vs. daily haul

Adding crops to corn-soybean rotations

Tillage systems

Specific goals of our research and outreach

Role of landscape characteristics versus farm management

Doug Jackson-Smith, Mark Powell

- Landscape-scale risk analysis of N balance and loss
- Surveys of farm characteristics and management practices
- Measurement of whole-farm N balances
- Identified barriers to adoption of improved N management

Ration formulation and manure manipulation

Glen Broderick, Zhiguo Wu, Rich Muck, John Grabber, Mark Powell, Larry Satter, Keith Kelling, Michael Russelle

- Rations with balanced feed protein and energy to
  - Optimize milk production
  - Reduce loss of N from manure
- Reduced N losses from manure storage
- Improved N retention by optimizing manure application

Integrated cropping systems

Jim Stute, John Hall, John Grabber, Mark Powell, Walter Goldstein, Michael Russelle, Keith Kelling, Rick Walgenbach, Ken Albrecht

- Systems that optimize forage production and N cycling
- Improved soil N cycling and C storage with forage tannins
- Increased manure N retention with cover crops
- Effective manure application methods in no-till and limited tillage

Education and Outreach

Leah Nell Adams, Martha Rosemeyer, Mark Powell, Doug Jackson-Smith

- New nutrient management educational programs and materials for farmers
- Environmental assessment materials for dairy farms
- A new Dairy Environmental Management Assessment system
- Curricula for University courses
- Training of technical and general audiences

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